WHAT IS CLAIMED IS:

1. A pressure sensor comprising:

a first membrane that flexes in response to pressure;

a reference cavity covered by said first membrane, said reference cavity containing a vacuum; and

a second membrane adjacent to said first membrane and not within said reference cavity, said first and second membranes forming a capacitor having a capacitance that varies in accordance with the flexing of said first membrane and said pressure.

2. The pressure sensor of claim 1, wherein said first and second membranes are made of silicon.

3. The pressure sensor of claim 1, further comprising:

an upper substrate; and

a lower substrate;

wherein said first and second membranes are supported between and bonded to said upper and lower substrates.

4. The pressure sensor of claim 3, further comprising electrical connections patterned on one of said substrates and in electrical connection with said first and second membranes for measuring said capacitance.

5. The pressure sensor of claim 1, wherein said first and second membranes are formed in a silicon substrate.

6. The pressure sensor of claim 5, further comprising a polysilicon anchor on both edges of said first membrane securing said first membrane in said silicon substrate.

7. The pressure sensor of claim 1, wherein said first or second membrane has a curvature.

8. A pressure system comprising:

a pressure regulator for regulating pressure in a pressurized environment; and

a pressure sensor disposed in or in communication with said pressurized environment so as to output an indication of said pressure in said pressurized environment, wherein said pressure regulator is configured to operate in response to said output from said pressure sensor;

wherein said pressure sensor comprises

a first membrane that flexes in response to pressure,

a reference cavity covered by said first membrane, said reference cavity containing a vacuum, and

a second membrane adjacent to said first membrane and not in said reference cavity, said first and second membranes forming a capacitor having a capacitance that varies in accordance with the flexing of said first membrane and said pressure.

9. The system of claim 8, wherein said first and second membranes are made of silicon.

10. The system of claim 8, wherein said pressure sensor further comprises:

an upper substrate; and

a lower substrate;

wherein said first and second membranes are supported between and bonded to said upper and lower substrates.

11. The system of claim 10, wherein said pressure sensor further comprises electrical connections patterned on one of said substrates and in electrical connection with said first and second membranes for measuring said capacitance.

12. The system of claim 8, wherein said first and second silicon membranes are formed in a silicon substrate.

13. The system of claim 12, wherein said pressure sensor further comprises a polysilicon anchor on both edges of said first membrane securing said first membrane in said silicon substrate.

14. The system of claim 8, wherein said pressure regulator comprises a vacuum pump.

15. The system of claim 8, wherein said pressure regulator comprises a compressor.

16. The system of claim 8, wherein said pressure regulator comprises a getter.

17. The pressure sensor of claim 8, wherein said first or second membrane has a curvature.

18. A pressure sensor integrated with a microelectromechanical system (MEMS) comprising:

a silicon substrate;

a MEMS formed on or in said substrate; and

a pressure sensor formed in said substrate, said pressure sensor comprising

a first membrane that flexes in response to pressure;

a reference cavity covered by said first membrane, said reference cavity containing a vacuum; and

a second membrane adjacent to said first membrane and not in said reference cavity, said first and second membranes forming a capacitor having a capacitance that varies in accordance with the flexing of said first membrane and said pressure.

19. The integrated pressure sensor and MEMS of claim 18, wherein said first and second membranes are made of silicon.

20. The integrated pressure sensor and MEMS of claim 18, further comprising a polysilicon anchor on both edges of said first membrane securing said first membrane in said silicon substrate.

21. The pressure sensor of claim 18, wherein said first or second membrane has a curvature.

22. A pressure sensor integrated with an atomic resolution storage (ARS) device comprising:

a first substrate;

an ARS device formed partially in said first substrate; and

a pressure sensor formed in said first substrate, said pressure sensor comprising

a first membrane that flexes in response to pressure;

a reference cavity covered by said first membrane, said reference cavity containing a vacuum; and

a second membrane adjacent to said first membrane and not in said reference cavity, said first and second membranes forming a capacitor having a capacitance that varies in

accordance with the flexing of said first membrane and said pressure;

wherein said pressure sensor monitors a vacuum in which said ARS device is contained.

23. The integrated pressure sensor and ARS device of claim 22, wherein said first substrate is made of silicon and said first and second membranes are made of silicon.

24. The integrated pressure sensor and ARS device of claim 22, further comprising:

an upper substrate; and

a lower substrate;

wherein said first substrate is bonded between said upper and lower substrates.

25. The integrated pressure sensor and ARS device of claim 24, further comprising electrical connections patterned on at least one of said upper and lower substrates and in electrical connection with said first and second membranes for measuring said capacitance.

26. The integrated pressure sensor and ARS device of claim 22, further comprising a polysilicon anchor on both edges of said first membrane securing said first membrane in said first substrate.

27. The pressure sensor of claim 22, wherein said first or second membrane has a curvature.

28. A method of fabricating a pressure sensor comprising etching a silicon substrate to form a reference cavity, a first membrane and a second membrane.

29. The method sensor of claim 28, wherein said etching further comprises forming said first or second membrane with a curvature.

30. A method of fabricating a pressure sensor comprising:

bonding a first substrate to a second substrate, said second substrate comprising electrical connections;

etching said first substrate to form a first membrane, a second membrane adjacent and spaced from said first membrane and a reference cavity bounded by said first membrane, wherein said first and second membranes are placed in electrical connection with said connections on said second substrate; and

bonding a third substrate to said first substrate to seal a vacuum in said reference cavity.

31. The method of claim 30, further comprising:

etching holes through said first substrate; and

filling said holes with an anchor material, wherein said first membrane is anchored in said first substrate by said anchor material.

32. The method of claim 31, wherein said filling said holes with anchor material comprises filling said holes with polysilicon.

33. The method of claim 30, wherein said substrates are formed of silicon.

34. The method of claim 30, wherein said etching further comprises forming said first or second membrane with a curvature.

35. A method of integrally fabricating a pressure sensor and an atomic resolution storage (ARS) device, said method comprising:

bonding a first substrate to a second substrate, said second substrate comprising electrical connections;

etching said first substrate to form a first membrane, a second membrane adjacent and spaced from said first membrane, a reference cavity bounded by said first membrane, and a flexture of said ARS device, wherein said first and second membranes are placed in electrical connection with said connections on said second substrate; and

bonding a third substrate to said first substrate to seal a vacuum in said reference cavity and said ARS device, and providing a vacuum cavity for said ARS device.

36. The method of claim 35, further comprising:

etching holes through said first substrate; and

filling said holes with an anchor material, wherein said first membrane is anchored in said first substrate by said anchor material.

37. The method of claim 36, wherein said filling said holes with anchor material comprises filling said holes with polysilicon.

38. The method of claim 35, wherein said substrates are formed of silicon.

39. The method of claim 35, wherein said bonding said third substrate further comprises forming passageways between said first membrane and said ARS device so that said vacuum of said ARS device can be monitored with said pressure sensor that comprises said first membrane.

40. The method of claim 35, wherein said etching further comprises forming said first or second membrane with a curvature.

41. A pressure sensor comprising:

a membrane integrally formed in a substrate by etching said substrate, wherein said first membrane flexes in response to pressure;

a reference cavity covered by said first membrane, said reference cavity containing a vacuum; and

an electrical connection to said first membrane for measuring a piezo-resistivity of said membrane, said piezo-resistivity varying in accordance with the flexing of said first membrane and said pressure.

42. The pressure sensor of claim 41, wherein said membrane and said substrate are made of silicon.

43. The pressure sensor of claim 41, further comprising:

an upper substrate; and

a lower substrate;

wherein said substrate from which said membrane is formed is supported between and bonded to said upper and lower substrates.

44. The pressure sensor of claim 43, wherein said electrical connection is patterned on either said upper or lower substrate.

45. The pressure sensor of claim 41, wherein said first membrane has a curvature.

46. A pressure sensor comprising:

a first means for flexing in response to pressure;

a reference cavity covered by said first means, said reference cavity containing a vacuum;

a second means for forming a capacitor with said first means, said capacitor having a capacitance that varies in accordance with the flexing of said first means and said pressure; and

means for measuring said capacitance;

wherein said second means is adjacent to said first means and not within said reference cavity.

47. The pressure sensor of claim 46, wherein said first and second means each comprise a membrane made of silicon.

48. The pressure sensor of claim 46, wherein said means for measuring said capacitance comprise electrical connections patterned on a substrate supporting said first and second means.

49. The pressure sensor of claim 46, wherein either said first or second means has a curvature.

50. A pressure sensor comprising:

a first means for deforming in response to pressure;

a reference cavity covered by said first means, said reference cavity containing a vacuum; and

means for measuring a piezo-resistivity of said first means, said piezo-resistivity varying in accordance with the deformation of said first means and said pressure.

51. The pressure sensor of claim 50, wherein said first means comprise a membrane made of silicon.

52. The pressure sensor of claim 50, wherein said first means has a curvature.

53. A pressure sensor comprising:

a first membrane that flexes in response to pressure;

a reference cavity covered by said first membrane, said reference cavity containing a vacuum; and

a second membrane adjacent to said first membrane, said first and second membranes forming a capacitor having a capacitance that varies in accordance with the flexing of said first membrane and said pressure;

wherein one of said membranes is curved with respect to the other said membrane.

54. The pressure sensor of claim 53, wherein said first and second membranes are made of silicon.

55. A method of fabricating a pressure sensor comprising:

etching a silicon substrate to form a reference cavity; and

etching said silicon substrate to form a first membrane having a curvature.

56. The method of claim 55, further comprising:

etching said silicon substrate to form a second membrane;

forming a capacitor of said first and second membranes.